

9/15/16

"Quality is not an act, it is a habit." -Aristotle

HW: "Rationalizing a Denominator" worksheet #3-37 odd

AIM: How do we Rationalize a Denominator?

Warm Up:

1) Simplify the following:

$$\frac{\sqrt{48} + \sqrt{3}}{\sqrt{3}}$$

← split into
2 fractions

$$\frac{\sqrt{48}}{\sqrt{3}} + \frac{\sqrt{3}}{\sqrt{3}}$$

$$\frac{1}{2} + \frac{5}{2} = \frac{1+5}{2}$$

$$\sqrt{16} + \sqrt{1}$$

$$4 + 1 = \textcircled{5}$$

$$2) \quad \frac{5}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{\cancel{5}^1 \sqrt{10}}{\cancel{10}_2} = \boxed{\frac{\sqrt{10}}{2}}$$

$\sqrt{100} = 10$

$$3) \quad \frac{4}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{2 \cdot 3} = \frac{\cancel{4}^2 \sqrt{3}}{\cancel{6}_3} = \boxed{\frac{2\sqrt{3}}{3}}$$

$\sqrt{9} = 3$

ALT:

$$\frac{\cancel{4}^2}{\cancel{2}_1 \sqrt{3}} = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{2\sqrt{3}}{3}}$$

$$4) \quad \frac{1}{5-\sqrt{2}} \cdot \frac{5+\sqrt{2}}{5+\sqrt{2}}$$

Conjugates
 $(5-\sqrt{2})(5+\sqrt{2})$
DOTS

$$\frac{5+\sqrt{2}}{25 + \cancel{5\sqrt{2}} - \cancel{5\sqrt{2}} - 2} = \frac{5+\sqrt{2}}{25-2} = \boxed{\frac{5+\sqrt{2}}{23}}$$

Cancel

⊛ To rationalize a binomial denominator we multiply both the top and bottom by the conjugate of the denominator.

Conjugates are the exact same terms but with opposite signs.

Ex: $5+\sqrt{7}$ and $5-\sqrt{7}$

5)

$$\frac{4}{4+\sqrt{7}} \cdot \frac{4-\sqrt{7}}{4-\sqrt{7}} = \frac{16-4\sqrt{7}}{16-4\sqrt{7}+4\sqrt{7}-7} = \frac{16-4\sqrt{7}}{16-7}$$

*(Note: Blue arrows indicate the FOIL process: 4*4=16, 4*(-√7)=-4√7, √7*4=4√7, √7*(-√7)=-7. The terms -4√7 and 4√7 are crossed out and labeled "cancel".)*

(Note: Above the second fraction, the conjugate pair (4+√7)(4-√7) is written in blue.)

$$\Downarrow$$

$$\frac{16-4\sqrt{7}}{9}$$